PART 1 – GENERAL CONDITIONS

1. The requirements of the Contract Documents, including the General and Supplementary Conditions shall apply to the work of this section.
2. The Pinellas County Schools Approved selected contractor shall provide services as requested to district facilities, inside and outside, based upon unit costs, hourly rates and percentage markup or discounted rates for equipment, parts and materials as entered on the bid proposal form. Under certain circumstances, parts and material may be supplied to the contractor by the district. All vehicle and/or equipment required by the contractor to complete a job shall be the responsibility of the Contractor. The district will not pay for rental or purchase of equipment needed by the contractor, nor will it pay for mobilization fees of any kind. In the event that the district supplies parts and materials for a specific project, the Contractor will be responsible for obtaining the parts and materials form the Maintenance Department at the Walter Pownall Service Center (11111 S. Belcher Rd., Largo, FL 33773-5204) or another designated place.

 C. At the time of bid, all exceptions taken to the Specifications, all variances from the

 Specification and all substitutions of operating capabilities or equipment called for in this

 Specification shall be listed in writing and forwarded to the project leader.

 Any such exception, variances or substitutions which were not listed at the time of bid and

 are identified in the submittal, shall be ground for immediate disapproval without comment.

* + - 1. RELATED DOCUMENTS
				1. Section 01 70 00 Close out check list
				2. Section 01 78 36 Warranties
				3. Section 22 05 53 Plumbing piping and valves
				4. Section 22 08 01 Testing
				5. Section 32 90 00 Planting
				6. Section 26 05 10 Basic Electrical Requirements
				7. Section 26 05 19 Building Wire and Cable
				8. Section 26 05 26 Grounding and Bonding
				9. Section 26 05 33.13 Conduit and Raceways
				10. Section 27 10 00 Structured Cabling
				11. Section 31 23 19 Dewatering and Bedding
				12. Section 31 40 00 Shoring Bracing and Underpinning

* + - 1. SCOPE OF WORK
				1. Provide all labor, materials to install a complete Irrigation System as shown on the drawings and stated in the Technical Specifications.
				2. Connection to existing water source on property at location shown on the drawings.
			2. QUALITY ASSURANCE
				1. Comply with Federal, State, County, Local and other duly constituted authorities and regulatory agencies.
				2. Installation and materials shall conform to the Standards and Specifications for Turf and Landscape Irrigation Systems, Florida Irrigation Society, Landscape Irrigation Florida Friendly Design, National Electrical Code and the current FLORIDA Plumbing and Mechanical Codes and applicable federal and state statutes and regulations.
				3. Local municipal codes and ordinances shall be reviewed and applicable provisions included as approved by Facilities Design and Construction staff.
			3. JOB CONDITIONS
				1. Responsibility to the Owner: The Contractor shall not willfully install the plumbing irrigation system as specified in the Contract Documents when it is obvious in the field that there are obstructions, grade differences and/or discrepancies in area dimensions until such conditions are brought to the attention of the Landscape Architect.
				2. Utilities and Structures: Attention is directed to the fact that overhead, underground and surface utilities, structures and vegetation are in the area of the work and must be protected against damage during the progress of the work.
				3. Protection and Safety: The Contractor shall be responsible and liable for the protection and safety against injury of property and persons on or about the project site during the term of his work. The Contractor shall provide and properly maintain necessary warning signs and lights, barricades, railings and other safeguards. The Contractor shall conform with the current Occupational Safety and Health (OSHA) Standards.
				4. Site Familiarity: The Contractor shall visit the project site to examine such conditions as soils, vegetation, utilities, structures, water supply, etc., as they will influence the work pursuant to bid submission and/or contract execution.
				5. Utility Connections: Location of utility connections shall be shown on the plans or as shown by the utility company. The Contractor shall include in his bid all costs for such utility connections.
				6. CRITERIA FOR WATER SUPPLY FOR IRRIGATION:

1) First precedence for irrigation water sources shall be reconstituted sanitary waste water (effluent or reclaimed) where available – subject to a feasibility study if the source of effluent is remote.

2) A second precedence for irrigation water shall be a well and pump system. Multiple wells and pumps may be utilized. Many factors determined by South West Florida Water Management District (SWFWMD) will govern whether and how wells may be drilled and used.

3) Due to the maintenance requirements for high school athletic fields, these areas shall be on an irrigation system separated from the rest of the campus.

* + - 1. SUBMITTALS

Submit the following:

Submit proposed work schedule.

Product Data: Submit six (6) copies of manufacturer's technical data and installation instructions for underground sprinkler system. Submit samples of all materials and equipment to be installed on the project.

Equipment: Submit a schedule of equipment to be installed, to include: automatic controller, zone control valves, gate valves, vacuum breaker valves, pressure throttle valves, direct burial wire, pop‑up rotor heads, pop‑up spray heads, fixed shrub heads, bubbler heads, special purpose heads, filters, fittings and valve boxes.

Design Data: Submit any all design data required under these specifications for all areas not shown on the irrigation plans that need irrigation rework of the existing system.

* + - 1. DEFINITIONS AND ABBREVIATIONS

The Definitions and abbreviations given here below shall be considered a part of these specifications and shall apply to the interpretation and execution hereof.

P.S.I.: Static water pressure shall be given as pounds per square inch, abbreviated P.S.I., and where (1) P.S.I. shall equal 2.31 feet of head.

G.P.M.: Volume of water shall be given as gallons per minute abbreviated G.P.M.

Zone: A zone shall be defined as a group of heads or emitter pipes operating at the same time downstream under a common control valve. A zone shall be derived as further described hereinafter on the basis of available water pressure and volume and physical location/orientation.

P.V.C.: P.V.C. shall denote the abbreviation for polyvinyl chloride (schedule 40) material used in the manufacture of pipe and fittings as further specified hereinafter.

Polypipe and Poly connectors: A flexible polyethylene pipe and fittings used in swing joints, head and pipe connectors.

Owner: That entity which holds title or control to the premises on which the work is performed.

Landscape Architect: This person or firm is the responsible representative of the Owner who produces the landscape and/or irrigation plans and specifications.

Contractor: In reference to these specifications, the "Contractor" shall mean the irrigation contractor bidding on and/or being awarded the contract for the work stipulated. Said Contractor shall be duly licensed and insured as an irrigation supplier/contractor to perform necessary water supply and distribution functions in the state, county and municipality where the work is to be executed.

Project: The project as referenced herein shall be that tract of real property where the irrigation system is to be installed.

Contract Documents: For the purposes of bid submission, contract agreement and execution of the work, the contract documents shall be binding upon all parties and shall include but not be limited to applicable plans, details, schedules, specifications and bidder instructions.

Equivalency: Relevant to manufacturer product lines specified herein, equivalents shall be of like type, manufacture, design, material, operation and performance. They shall be approved by the Landscape Architect and owner representative.

The Plans: Design drawings and specifications provided by the Landscape Architect. In the event of conflict between the plans and the written specifications, the plans shall prevail.

1. MATERIALS
	* + 1. PRODUCTS
				1. All material shall be of new stock and best grade of its kind. It shall be as specified unless otherwise specifically approved by the Landscape Architect and owner representative. Materials not named shall be subject to approval or rejection by the Landscape Architect and owner representative. In all cases, workmanship and material shall conform to the local plumbing code having jurisdiction. Materials shall be installed as recommended by the Manufacturer.
				2. No drip (emitter) irrigation system is to be installed.
				3. Available Manufacturers:

Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

1. Rain Bird Sprinkler Mfg. Corp.
2. The Toro Co., Irrigation Division
3. Weather – Matic Division/Telsco Industries
4. Hunter Industries
	* + - 1. Products the contractor wishes to substitute as an "Approved Equivalent" must be submitted to the Landscape Architect and owner, in writing, a minimum of ten (10) days prior to the bid date. The Landscape Architect and owner will provide either an approval or rejection of all products submitted in this fashion.
				2. Plastic pipe shall be rigid, high impact, Type I, un-plasticized polyvinyl chloride. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blister, deleterious wrinkles or dents and shall conform to the following dimensions and physical properties:

All plastic pipe shall be continuously and permanently marked with manufacturer's name, kind of pipe, material size, IPS, NSF approval, schedule and type.

Plastic pipe shall be as manufactured by Lasco, Celanese, Pacific Western, Johns Manville, Colonial, Universal.

Polyethylene pipe to be used for swing joints (for spray heads only) or connectors at appropriate P.S.I. ratings.

* + - * 1. All main and lateral line piping used on this project shall be Schedule 40 P.V.C. unless otherwise approved in writing by the Landscape Architect and the Owner. If water supply is reclaimed water all lines must use the designated color for reclaimed water (purple).
				2. Pipe Fittings:

Plastic pipe fittings to be installed shall be medium weight injection molded for virgin Type II high impact un-plasticized rigid polyvinyl chloride (P.V.C.) molding compound. All plastic slip couplings shall be extruded fittings from same material as specified for plastic piping herein, unless otherwise approved by the Landscape Architect. Plastic pipe cement and lubricant shall be as recommended by pipe manufacturer.

Galvanized pipe and fittings: Where indicated, or required by code, use galvanized steel pipe ASA schedule 40 mild steel screwed pipe. Fittings shall be medium galvanized screwed, beaded malleable iron. Galvanized couplings may be a merchant coupling.

Under Pavement Lines: All piping under concrete and asphalt vehicle pavement, curbs, and unpaved areas subject to other than normal loads shall be rigid P. V. C. Schedule 40.

* + - * 1. Sprinkler Risers and Connectors:

Shrub risers are to be Schedule 40.

Pop‑up spray connectors (from tee to head base) are to be threaded, flexible polyethylene.

 Swing connectors preferred on athletic fields.

Pop‑up rotor connectors (from tee to head base) are to be rigid 1" Schedule 80 PVC or Marlex swing joints.

* + - * 1. Valves:

1) Only Rainbird or Irritrol brand valves are to be used.

Manufacturer's standard, of type and size required, and as herein further specified, clearly identified with purple markings or labels for Reclaimed Waste Water.

Automatic Circuit Valves: Globe or angle configuration valves operated by low‑power solenoid, normally closed, manual flow adjustment. All electric/hydraulic control valves shall be fully compatible with the automatic controller with respect to the type of control, voltage, amperage or pressure specifications and "normal" sequence positioning.

Quick Coupling Valves (if specified): Shall have a brass two‑piece body designed for working pressure of 150 P.S.I. operable with a quick coupler. Key size and type shall be as shown on the plans or presented in the equipment schedule. Cover to be clearly identified by purple markings for Reclaimed Waste Water.

* + - * 1. Sprinkler Heads:

Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure. Top of head to be clearly identified with purple markings for Reclaimed Waste Water.

Pop‑Up Spray: Fixed or adjustable pattern, with screw‑type flow adjustment and stainless-steel retraction spring, Rainbird 1800 series.

Pop‑up Rotary Sprays: Gear driven, full circle and part circle.

All tree bubblers must be on a separate zone independent of other zones for sod.

Large open areas of sod shall use stainless steel I-20 heads.

High school athletic fields shall use stainless steel I-25 or I-40 heads.

* + - * 1. Valve Boxes:

All ball and control valves shall be set in valve boxes with snap lock covers flush with finished grade. Valve boxes shall be "Nelson 8500 or “N.D.S.”.

All valve boxes must be purple if source is reclaimed waste water.

* + - * 1. Automatic Control System:

Control systems shall be manufactured by Rainbird or Hunter. (All new system installations will use Hunter two wire controller system.)

The automatic controllers shall be as specified on the Plans or shall be of a capacity as required to efficiently operate the zones throughout the building and parking lot sites. The 120 volt electrical power to the automatic controller’s location is to be furnished by the Owner (See Facilities Manager for exact controller location). Irrigation Sub-Contractor shall make all connections in the low-voltage system between the automatic controller and the valves.

Schedule the controller time clocks to operate the system control as nearly as possible between the hours of 11:00 P.M. and 7:00 A.M, and on the days required by local watering guidelines for deep well water source systems.

Rain gauges/rain sensors must be installed on each automatic control system. Location must be approved by landscape architect and owner representative.

The electric power supply breaker location shall be clearly marked on Automatic Control System and Pumps.

* + - * 1. Sleeves and Conduits:

All pipe and wiring under paving shall be placed in separate Schedule 40 P.V.C. sleeves and conduit respectively for the full pavement covered length. Sleeves and conduit are to be installed as shown on the Irrigation Plan or determined in the field. Sleeves and conduit shall be of adequate diameter to accommodate the pipe(s)/wire(s) with sufficient free play to allow removal and reinstallation without binding.

* + - * 1. Control Wiring:

Connections between the automatic controllers and the electric control valves shall be made with direct burial wire AWG‑U.F. #14‑600 volt. Use red for pilot wire and white for common wire. Install in accordance with valve manufacturer's specifications and wire chart. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. Place wire under water lines. Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten (10) feet. Tape to the bottom of the mainline at (8) foot intervals when in common trench. When wire only is placed in a trench, place under a continuous strip of subgrade: use pressure‑treated southern yellow pine, 1" x 2", and attach to board at (8) foot intervals. An expansion curl shall be provided within three (3) feet of each wire connection and at least every one hundred (100) feet in length. Expansion curls shall be formed by wrapping at least five (5) turns of wire around a pipe 1" (or more) in diameter, then withdrawing pipe. All splices shall be made with pen‑tite fasteners. All control wiring or tubing routed beneath or through pavements, walks, curbs and/or other structural elements shall be run through P.V.C. Schedule 40 conduit of sufficient diameter for wire pulling. All conduit and sleeves for irrigation pipes and control wiring shall be installed by the irrigation sub-contractor. The 120 volt electrical power to the controller location to be furnished by the Owner.

All wire splices must be in a separate box, separate from the valve control box.

* + - * 1. Valves

General: shall be manufactured by Rainbird or Irritrol, of type and size required, and/or as specified on the Plans.

Loop system irrigation requires isolation ball valve installed and marked on as-builts.

All splice boxes shall be marked by GPS coordinates~~.~~

Ball Valves shall conform to federal specification ASTM D2466, ASTM D1784, cell Class 12454, NSF/ANSI Standard 61, UL Listed 94V-0, NSF U.P. Certified.

Valves shall be clearly identified with purple markings and labels when Reclaimed Waste Water is used.

Automatic Circuit Valves: Globe or angle configuration valves operated by low‑power solenoid, normally closed, manual flow adjustment. All electric/hydraulic control valves shall be fully compatible with the automatic controller with respect to the type of control, voltage, amperage or pressure specifications and "normal" sequence positioning.

Quick Coupling Valves: When specified, shall have a brass two‑piece body designed for working pressure of 150 P.S.I. operable with a quick coupler. Key size and type shall be as shown on the plans or presented in the equipment schedule.

Other Valves: shall be PVC unless approved otherwise as stated on the Plans.

* + - * 1. Backflow Prevention:

Backflow prevention shall be as approved by the local governing body.

1. EXECUTION
	* + 1. SYSTEM DESIGN
				1. General:

The Contractor shall provide any additional irrigation design data required to complete the Contract Documents. All Contractor submitted design data must provide for a 100% coverage to all planting and sodded areas to be irrigated as shown on the plans.

Athletic field play surfaces shall be on different zones than perimeter areas (i.e. 360 degree heads not on same zone as 180 degree heads).

On athletic field play surfaces, all irrigation main lines and valve boxes shall be installed as far away from play surfaces as possible and practical.

Layout of heads needs to be based on the minimum operating pressure and GPM of the water source.

System zoning. The irrigation system should be divided into zones based on consideration of the following:

Available flow rate

Cultural use of the area

Type of vegetation irrigated, i.e., turf, shrubs, native plants, etc.

Type of sprinkler, i.e., sprinklers with matching precipitation rates

Soil characteristics

* + - * 1. Design Liability:

All irrigation design data provided by Contractor shall be the full liability of the Contractor. All such design data shall be consistent with manufacturer's materials and installation methods, code compliance, coverage, application, distribution and operation and the provided plans and technical specifications.

* + - * 1. Design Pressures:

Design Pressures should be as recommended by the pipe and fitting manufacturer type of pipe selected, or as indicated on drawings.

* + - 1. INSTALLATION
				1. Comply with all requirements of the Florida Building Code.
				2. Layout:

The locations of heads are approximate. Make minor adjustments as necessary to avoid plantings and other obstructions and to obtain coverage. Pipe may be shown in building, concrete, and/or asphalt areas for clarity only. Locate all pipe in planting areas where appropriate.

* + - * 1. Excavation/Trenching:

Trenches shall be dug straight. Trench bottoms shall be at true gradient providing support to pipe through its entire length and shall be free from rocks, clods, debris and sharp‑edged objects. The minimum depth of lines measured to top of pipe, unless otherwise indicated on plans, shall be:

Main lines and quick coupler lines shall be 18".

Lateral sprinkler lines shall be 12".

Non‑pressure rotor head lines shall be 15".

Provide minimum cover of 18” for all control wiring When not strapped to bottom of pipe.

Where required or indicated on the plans, existing sod shall be removed where trenches are to be dug, and shall be protected from drying and replaced within 48 hours. Sod shall be cut in such a manner that a minimum of 2" of soil remains on the roots. The soil should be moist, but not wet, to prevent excessive loss due to crumbling. This Irrigation Sub-Contractor shall have all the responsibilities to maintain sodding and grass; trees, shrubs, and plants; as required by Section 02900. This Irrigation Sub-Contractor may, at his option, contract with the Landscape, sodding and grass Sub-Contractor to handle this responsibility.

Back-fill shall not be placed until the installed irrigation system has been thoroughly inspected and tested by the Contractor (the Landscape Architect may request an inspection by his own personnel prior to back-filling of trenches). Back-fill material shall be approved soil, free from large rocks, debris or sharp objects. In general, the material removed from excavation may be used. Excavated rocky material shall be removed from the site and suitable fill material obtained for back-fill. Back-filling shall be done when pipe is not in an expanded or contracted condition due to temperature extremes. Cooling of the pipe can be accomplished by operation of the system for a short time before back-fill, or by back-filling in the early part of the morning before the heat of the day. Back-fill shall follow excavation with the least possible delay. Open trenches shall be adequately protected to cause the least possible hazard to and interference with people and animals. Back-fill shall be compacted in compliance with Earthwork Section. The operation shall be repeated until finished grade of back-filled trenches matches that of adjacent soil.

* + - * 1. Water Connection:

Connect irrigation system to existing source on site. Connection shall include but may not be limited to the installation of appropriate ball valves, shut-off valves, and concrete meter box as required. Coordinate time of connection with affected persons in order to minimize irrigation downtime. Required modifications and/or relocations of equipment associated with the existing well shall be included in the irrigation work.

Municipal and County regulations must be adhered to during this and all other portions of work in this section.

The potable water supply to irrigation systems shall be protected against backflow by an atmospheric vacuum breaker, a pressure vacuum breaker assembly or a reduced pressure principle backflow prevention assembly. Valves shall not be installed downstream from an atmospheric vacuum breaker. Where chemicals are introduced into the system, the potable water supply shall be protected against backflow by a reduced pressure principle backflow prevention assembly.

* + - * 1. Circuit Valves:

Provide union on downstream side.

Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

Wherever possible, locate valves in plant bed areas for best concealment and accessibility.

Valves are to be installed in “N.D.S. or Nelson 8500" valve boxes, large enough to accommodate maintenance and operation of valves. Provide a 1/2" diameter river gravel sump 3" thick at bottom of valve pit.

All valve connections and wire splices must have water proof connectors.

All valves shall be marked by GPS coordinates.

* + - * 1. Piping:

Pipe shall be handled and stored in a manner to prevent damage. The plastic pipe and fittings shall be stored under cover, and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lie flat so as not to be subject to undue bending or concentrated external load at any point. Any plastic pipe that has been dented or damaged shall not be used unless such damage has been cut and pipe is rejoined with a coupling.

Clean interior of pipe thoroughly and remove all dirt or foreign matter before lowering pipe into trench. Keep pipe clean during operations by plugs or other approved methods. The ends of all threaded pipe shall be reamed out full size with a long taper reamer so as to be partially bell‑mouthed and perfectly smooth. All offsets shall be made with fittings. All water lines shall be thoroughly flushed out before heads are installed.

Lay pipe on solid sub‑base, uniformly sloped without humps or depressions.

Thrust Blocks shall be installed on all main lines at all changes in piping direction.

Install P.V.C. pipe in dry weather when temperature is above 40 degrees Fahrenheit allowing glue to cure in strict accordance with manufacturer's recommendation.

Welded joints shall be given at least 15 minutes set‑up curing time before moving or handling. Pipe shall be partially center loaded to prevent arching and whipping under pressure. Plastic pipe shall be cut with a hand saw, hacksaw or other tool approved for such use in a manner so as to insure square ends. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained. All plastic‑to‑plastic joints shall be solvent‑weld joints. Only the solvent recommended by the pipe manufacturer shall be used. The solvent‑weld joints shall be made in the following manner:

Thoroughly clean the mating pipe and fitting with a clean dry cloth.

Apply primer to all connections prior to applying solvent. Use only compatible primer following manufacturer's specifications.

Apply a uniform coat of solvent to outside of the pipe with a non‑synthetic bristle brush. Apply solvent to the fitting in a similar manner.

Gray glue (Weld-on) and purple primer must be used on pipe sizes 2” in diameter or larger.

Wet/dry (Weld-on) and purple primer must be used on pipe sizes under 2” in diameter.

Reapply a light coat of solvent to pipe and quickly insert it into the fitting. Give the pipe or fitting a quarter turn to insure even distribution of the solvent and make sure that the pipe is inserted to the full depth of the fitting socket.

Hold in position for 15 seconds. Wipe off excess solvent that appears at the outer shoulder of the fittings.

Care shall be taken so as not to use an excess amount of solvent thereby causing a burr or obstruction to form on the inside of the pipe. The joints shall be allowed to set at least 24 hours before pressure is applied to the system.

* + - * 1. Pipe jointing, in general, shall be performed by competent tradesmen specially trained in the type of work required and using tools and equipment recommended by the manufacturers of the pipe, fittings or equipment.
				2. Galvanized Steel Pipe and Fittings: Threads shall be sound, clean cut, and well fitting. Threaded joints shall be made up with the best quality pure joint compound or lead paste, carefully and smoothly placed on the male threads only, throughout the system. Any leaky joints shall be remade with new material. Use of thread cement or caulking to make joints tight will not be permitted. All cut ends shall be remade to full bore before assembly.
				3. Plastic to Steel Connections: Male thread plastic to female thread steel shall be used. The same shall apply to plastic and brass or other metal. In no case shall metal be screwed into a plastic fitting. A non‑hardening pipe dope such as "Permatex No. 2", or equal, shall be used on threaded plastic to metal joints, and light wrench pressure should be used.
				4. Hose bibs:

If specified, shall be installed up stream of the electric valve in the same meter box. (Hose bibs may be used with a pressure gauge to check operating pressure.)

* + - * 1. Sprinkler Heads and Adjustment:

Sprinkler heads shall be installed in a plumb position at intervals not to exceed the maximum spacing specified by the manufacturer for project conditions, or as indicated on the drawings.

Heads in turf areas shall be installed 6" away from the edge of the curb or walk, and shall be set 3/8" below the edge of the curb or walk. All heads shall be installed on flexible connectors or swing joints and shall allow for vertical adjustment of heads. 6" pop‑up spray heads or pop‑up rotors (where appropriate) shall be used in turf areas.

All groundcover areas, including mass plantings of dwarf shrubs not exceeding 22", shall be irrigated with 12" pop-up spray heads and extenders.

Shrub risers shall only be installed in hedges or mass plantings of large shrubs and are not to extend more than 3" above the installed height of the shrub. If risers are used in hedges abutting parking areas, they must be placed a minimum of 30" away from back of curb and imbedded in hedge so as not to been seen or damaged by vehicle overhang. All risers and other above‑ground piping and fixtures shall be painted with a permanent flat black enamel paint. Stake all risers over 2' with 1/4" reinforcing rod fastened securely to riser.

Provide swing joints on all pop‑ups and rotors located adjacent to vehicular and pedestrian ways. Flexible polypipe may be used as swing joints for spray heads only. All rotor heads shall be installed with rigid ¾” or 1” Schedule 40 PVC swing joints.

Pop‑up heads adjacent to vehicle pavement that is not curbed shall be installed with concrete donut protectors set flush with the top of the heads. Heads installed adjacent to pedestrian curbs or walks shall be installed 6" away from the curb or walk. Where adjacent to buildings, fences or similar structures, heads shall be installed 6" away from the structure.

Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.

Adjustable sprinklers shall be adjusted by fully opening the sprinkler farthest from the control valve. The manual adjustment of the control valve shall be opened slightly to obtain a 12" high spray at the sprinkler mentioned above. After this condition has been met, all other sprinklers in the section shall be adjusted for equal height sprays, regulating the control valve as required to maintain this condition. With pressure gauge on the sprinkler first opened, the control valve shall be adjusted to obtain the catalog rated pressure for the sprinkler installed. Individual heads shall be rotated as required to keep sprays within the areas of lawn or shrubbery. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage, make such adjustments prior to planting. Adjustments may also include changes in nozzle sizes and degrees of arcs as required.

Heads shall be set at grade, before landscaping or sod is installed.

Irrigation/sprinkler systems and risers for spray heads shall not be installed within 1 foot of the building sidewall or other vertical structures.

* + - 1. SYSTEM CHECK
				1. In no event shall the Contractor cover up or otherwise remove from view any work under this contract that has not been thoroughly inspected and tested. The Owner and/or Landscape Architect shall be present at time of inspection and testing. Any work covered prior to being inspected shall be opened to view by the Contractor at his expense. Notify the Owner and Landscape Architect with no less than 24 hours in advance to Schedule testing.
				2. Pressure Testing: All pressure lines shall be tested prior to back-fill of joints. As soon as lines are connected, flushed out, and valves are attached, cap all outlets and hydrostatically test at available pressure for a continuous 4 hour period, at the end of which the lines and joints shall be inspected. If leaks develop, the joint or joints shall be replaced, and the tests repeated until all leaks are repaired. Any covered pipe found to leak, shall be excavated and repaired at the Contractor's expense.
				3. Operational Testing: The entire installation shall be placed in operation by the Contractor and tested in the presence of the Owner or his Representative for proper functioning as a whole. Location and arc of heads shall be adjusted if required to eliminate any dry spots, over‑water or spillage on adjacent areas and to prevent over-spray onto walks, roadways and buildings as much as possible.
			2. AS BUILT RECORDS AND ADDITIONAL EQUIPMENT
				1. Furnish record drawings of "as built" conditions as follows:

Location of water supply.

Tie‑in and Owner furnished electrical service and disconnects.

Location of valve controllers and other control equipment

Routing and sizing of sprinkler pipe.

Location and type of sprinkler heads.

Location and size of gate and zone control valves.

Routing of zone control valve electrical wiring.

The location of all "as built" conditions different from the original drawing shall be to scale from permanent points of reference. Exact location of main lines, control cables, and control valves shall be shown.

Show valve numbers, GPM rates and splice box locations.

If on new well, provide the following information:

Permit #

Installation contractor

Well use

Casing diameter

Static water level

Casing depth

Total depth

Date installed

Pump type, horsepower, GPM, PSI, voltage,

Pressure switch (min/max psi)

* + - * 1. The Contractor shall provide as part of this contract two sets of sprinkler wrenches for adjusting, cleaning or disassembling each type of sprinkler. Two each of any special tools required for any other equipment shall also be furnished.
				2. Six (6) service manuals for all equipment used shall be furnished to the Owner. Manuals may be loose‑leaf and should show drawings or exploded views of equipment and catalog number. Operation instructions for all equipment shall be furnished.
				3. Manufacturer verified on-site training of PCSB irrigation techs, HPO, groundskeeper and any other affected personnel of all components (i.e. clock locations and operation, valves, shut offs) related to operation of irrigation system.
			1. WARRANTY
				1. The Irrigation Sub-Contractor and Contractor shall Warranty all materials employed in the irrigation installation, are installed as specified and is in accordance with best trade practices. The Warranty shall also state there are no unauthorized substitutions of materials.
				2. The Irrigation Sub-Contractor and Contractor shall warrant the work for a period of one (1) year.
				3. The Contractor shall be responsible to replace all plant materials which have declined in health or have died due to a defective irrigation system. The contractor shall replace affected plantings with a plants of same variety and value within ten days of notice.
				4. Corrections: Should any trouble develop within the specified warranty period which in the opinion of the Owner is due to inferior or faulty materials and/or workmanship, the trouble shall be corrected without delay by the Contractor, to the satisfaction of and at no expense to the Owner.
				5. Liability: Any and all damage to rain water drains, water supply lines, gas lines and/or other service lines, shall be repaired and made good by the Contractor at no extra cost to the Owner. It is the responsibility of the Contractor to be aware of the location of all utilities or other permanent or non‑permanent installations and to protect these installations from any damage whatsoever.

**END OF SECTION**